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ADDITIONS TO OUR KNOWLEDGE OF THE AMERICAN AND HAWAIIAN FLORAS

BY

EARL EDWARD SHERFF

RESEARCH ASSOCIATE, SYSTEMATIC BOTANY

BOTANICAL SERIES

FIELD MUSEUM OF NATURAL HISTORY

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ADDITIONS TO OUR KNOWLEDGE OF THE AMERICAN AND HAWAIIAN FLORAS[1]

EARL EDWARD SHERFF

Pittosporum amplectens sp. nov.—Rami saltem novelli valde adpresso-hispidi setis fulvis. Folia subnumerosa, suberecta, plus minusve terminaliter disposita, sicca brunneo-viridia, novella hispida, oblonga vel (interdum latissime) oblongo-oblanceolata, apice acuminata, magnitudine variabilia; petiolo gracili, glabro vel irregulariter sparsissimeque tomentoso, 1–4 cm. longo; lamina nunc glabra nunc praecipue infra sparsim adpresso-setosa setis gracilibus fulvisque, supra raro subnitida, infra perspicue elevato-venosa, nunc tantum 1 dm. longa et ±2 cm. lata nunc plerumque ±1.9 dm. longa et ±6.5 (etiam +8) cm. lata. Flores non visi. Pedunculi fertiles axillares caulinive, saepe subverticillate 2–3-congregati, saltem demum subglabrescentes, plerumque 5–10 mm. longi; pedicellis usque ad circ. 10, 3–5 mm. longis. Capsulae fere semimaturae saepe 6–9-congregatae, laeves glabraeque, circumambitu ovali-oblongae, 1.5–1.7 cm. longae (stylo gracili ±3 mm. longo excluso) et 1.2–1.4 cm. latae; unica matura valva visa, hac circumambitu subcordato-rotundata, extus laevi glabraque, circ. 2.3 cm. longa et ±2.6 cm. lata. Semina atra, laevia, sub 6 mm. longa et 5 mm. lata.

At least young portions of branches strongly appressed-hispid with brown setae. Leaves subnumerous, suberect, more or less terminally disposed, brownish-green when dry, hispid when young, oblong or (at times very broadly) oblong-oblanceolate, at apex acuminate, variable in size; petiole slender, glabrous or irregularly

[1] The following abbreviations are used for the depositories of specimens cited in this paper: Arn., Arnold Arboretum, Jamaica Plain; Berl., Berlin Botanical Garden; Bish., Bernice Pauahi Bishop Museum, Honolulu; Corn., Cornell University Herbarium, Ithaca; Deg., herbarium of Otto Degener, Honolulu; Del., Delessert Herbarium, Geneva; Field, Field Museum of Natural History, Chicago; Goth., Arboretum of Gothenburg; Gray, Gray Herbarium of Harvard University, Cambridge; Kew, Royal Botanical Gardens, Kew; Minn., University of Minnesota Herbarium, Minneapolis; Mo., Missouri Botanical Gardens, St. Louis; N. Y., New York Botanical Garden; Par., Museum of Natural History, Paris; U. S., United States National Museum, Washington; Yunck., herbarium of Dr. Truman George Yuncker, Greencastle, Indiana.

To conform with the usage employed throughout my previous writings, the term *cotype* is used to connote a duplicate of the type, as shown usually by the fact that the duplicate bears the same collector's name and number and same habitat-data. The term as here used is thus the equivalent of *paratype* or *isotype* as used by certain other authors.

and very sparsely tomentose, 1–4 cm. long; blade now glabrous now especially beneath sparsely appressed-setose with slender, brown setae, above rarely subglossy, beneath conspicuously salient-veiny, now only 1 dm. long and ±2 cm. wide now commonly ±1.9 dm. long and ±6.5 (or even +8) cm. wide. Flowers not seen. Peduncles of pistillate flowers axillary or cauline, often subverticillately 2–3-clustered, at least finally subglabrescent, commonly 5–10 mm. long; pedicels up to about 10, 3–5 mm. long. Capsules almost semimature often 6–9-clustered, smooth and glabrous, in outline oval-oblong, 1.5–1.7 cm. long (excluding the slender, ±3 mm. long style) and 1.2–1.4 cm. wide; a single mature valve seen, this subcordate-rounded in outline, externally smooth and glabrous, about 2.3 cm. long and ±2.6 cm. wide. Seeds black, smooth, under 6 mm. long and 5 mm. wide.

Specimens examined: *Joseph F. Rock* 8,376, on the slopes and in crater of a small, extinct volcano, west of Honokanenui, mountains of Kohala, Isl. Hawaii, June, 1910 (Arn.; Berl.; Bish.; Del.; Field, 2 sheets; Kew; Par.); *Rock* 8,384, Kohala, Isl. Hawaii, June 20, 1910 (type, Bish.).

Smaller-leaved sprays, at least in the absence of flowers, offer an illusory resemblance to normal material of *Pittosporum glabrum* of Oahu, but can be told by the hairs persistent here and there underneath some of the leaves. Such sprays suggest *P. sulcatum* var. *Remyi* except that they have erugose and glabrous, not rugose and pubescent, capsules. The seeds are rather small for the size of the mature capsule, thus leaving ample space in the capsular chamber. In this respect there is a resemblance to the mostly larger-fruited and otherwise very different *P. Hosmeri* and its var. *longifolium*, both of Hawaii. The very large leaves on most of the material examined call to mind, however, still other species and it is found that *P. amplectens* embraces[1] in one combination an assortment of characters that elsewhere are more or less separately associated with diverse forms.

A tentative Greek-Latin name which Rock applied to both his no. 8,376 and his no. 8,384 in the herbarium indicated that they preferred marsh and forest.[2] Some of the largest leaves are much

[1] Whence the trivial name *amplectens*, embracing.

[2] Rock had labeled all of his material as a new species, but later, in his Indigenous Trees of the Hawaiian Islands (pp. 153–172. 1913), he omitted mention of it. This omission was covered by his general explanation which follows: "the writer wishes to state that he has gathered much material from localities where Pittosporums had never been recorded. Some of them (*sic*) undoubtedly are

discolored with black patches, as in leaves, for example, of *Pittosporum Gayanum* of Kauai. In the case of *P. acuminatum*, Rock (in herb.) attributed such discoloration to the fungus, *Capnodium lanosum*.

Pittosporum acutisepalum (Hillebr.) comb. nov.; *Pittosporum glomeratum* var. β *acutisepalum* Hillebr. Fl. Haw. Isls. 23. 1888.

In 1865 or earlier, Hillebrand collected at Nuuanu on the Island of Oahu a sheet of fine material of a *Pittosporum* which he labeled, "*Pittosporum an sp. nova aff. P. glabro.*" This was sent to Hooker and is now in the Kew Herbarium. In his Flora of the Hawaiian Islands, published considerably later, Hillebrand described identical material, from "Palolo to Niu" on Oahu, for his new variety *acutisepalum*[1] of his new species *P. glomeratum*. Recently I have been supplied by Dr. L. Diels, Director of the Berlin Botanical Garden, with excellent photographs of Hillebrand's types of both *P. glomeratum* and its var. *acutisepalum*. It is evident from a comparison of these photographs with Hillebrand's original descriptions and the more recently collected herbarium materials that the var. *acutisepalum* may well be regarded as a distinct species.

Specimens examined: *Erling Christophersen & Gerrit P. Wilder* 1,429 *pro parte*, in moist place, alt. 500–600 meters, East Palolo ridge, Oahu, January 16, 1931 (Berl.; Bish.; Field, 2 sheets; a form with sepals often only 5 mm. but petals ±17 mm. long, entirely separate and very slender; the flowering specimens of this set originally commixed by the collectors with mature fruiting specimens of *P. sulcatum*); *Otto Degener* 10,975, in rain-forest, Mt. Olympus, Oahu, January 9, 1927 (Berl.; Deg.; Field); *Degener & Kwan Kee Park* 10,983, in forest, Wilhelmina Rise, Oahu, November 11, 1931 (Berl.; Field); *Degener, Takamoto, Tam, & Martinez* 10,798, in lower forest, east ridge of Manoa Valley, Oahu, March 29, 1936

new, but owing to incomplete specimens, as the wanting of flowers, or mature capsules, the writer thinks it advisable not to include them in this already voluminous book, but rather to wait for additional material and then make an exhaustive study of this very variable group of plants." In not taking up Rock's unpublished herbarium name, I have followed the recommendations accompanying the International Rules.

[1] Spelled *acutisepala* by Hillebrand in his posthumously published Flora. I assume that he inadvertently used the feminine ending *a* in his mss. to accord with an understood "*varietas*" rather than to connote a substantive-plural use of the word. (*Cf.* his *Tetramolopium Chamissonis* var. *arbuscula* on p. 199, *T. arenarium* var. *dentata* on p. 200, and *Claoxylon sandwicense* var. *tomentosa* on p. 399 of the same work. In these last two cases he of course could not have intended a substantive use. In the case of the somewhat comparable *Panicum monticola* published by Hillebrand on pp. 494 and 500, it seems entirely possible that he was in fact thinking in terms of a substantive.)

(Corn.; Del.; Mo.; *cum P. glabro commixtum*); *J. Arthur Harris* C242,243, Oahu, September 10, 1924 (Goth.); *Hillebrand*, Nuuanu, Oahu (Kew).

Pittosporum glabrum var. **glomeratum** (Hillebr.) comb. nov.; *Pittosporum glomeratum* Hillebr. Fl. Haw. Isls. 23. 1888.

An extended search through herbarium material reveals no specimens matching Hillebrand's type. Rock, who had not as yet seen the type specimen, wrote in 1913 (Indig. Trees Haw. Isls. 157) that *P. glomeratum* Hillebr. "comes very close to *P. glabrum* and is perhaps only a form of it." At Berlin the type sheet had been "bearbeitet für das 'Pflanzenreich' " by Moeser and the name *glomeratum* reduced to the rank of a mere forma under *P. glabrum*. On a different sheet of Hillebrand's Hawaiian *Pittosporum* material at Berlin, Rock later had written (as translated by me from the photograph sent me by Dr. Diels): "I agree entirely with L. Moeser, *Pittosporum glomeratum* is in any case only a form of *P. glabrum*." My own judgment is that *P. glomeratum* is specifically affiliated, to be sure, with *P. glabrum*, but is entitled to varietal rank under that species. From *P. glabrum* proper it differs in its pedunculate *cluster of almost sessile* flowers, *pubescent* peduncle, sepals and ovary *tomentose*, etc.

Pittosporum glabrum intermedium var. nov.—Inflorescentia caulina axillarisve perspicue patenti-pilosa pilis brunneis multiloculatis ac minute glandulo-capitatis, masculina ±9-flora; pedunculo brevi sub 6 mm. longo, pedicellis gracilibus sub 8 mm. longis, bracteis subulatis sub 3 mm. longis, sepalis subulato-lanceolatis tergo glabrescentibus 4–5 mm. longis; feminea usque ad 14-flora, pedunculo demum usque ad 1.2 cm. longo, pedicellis crassiusculis brevioribusque, sepalis latioribus ovato-attenuatis. Capsulae glabrae vel aegre irregulariterque tomentellae, valvis usque ad 3.5 cm. longis et 2.9 cm. latis. Semina usque 7 mm. longa, 5 mm. lata, 4 mm. crassa.

Inflorescence cauline or axillary, conspicuously spreading-pilose with multiloculate and minutely glandular-capitate brown hairs, the staminate ±9-flowered, its short peduncle under 6 mm. long, pedicels slender and under 8 mm. long, the subulate bracts under 3 mm. long, sepals subulate-lanceolate as well as glabrescent and 4–5 mm. long; pistillate inflorescence up to 14-flowered, its peduncle finally up to 1.2 cm. long, pedicels rather thickish and shorter, sepals wider and ovate-attenuate. Capsules glabrous or weakly and

irregularly tomentulose, their valves up to 3.5 cm. long and 2.9 cm. wide. Seeds up to 7 mm. long, 5 mm. wide, 4 mm. thick.

Specimens examined: *Charles N. Forbes* 1,676–*O*, Palehua, Waianae Range, Isl. Oahu, Apr. 1–4, 1911 (type, Bish.: cotypes, Berl.; Field).

The pilose inflorescence distinguishes from the species proper and somewhat suggests var. *spathulatum*, but the multiloculate and glandular nature of the hairs, also the more attenuate sepal-tips and more nearly or even completely glabrous capsules offer a distinction from that variety.

Pittosporum glabrum var. **spathulatum subcandidum** f. nov.—Foliorum laminae facie inferiore irregulariter sparsimque (petioli surculique dense) tomentosae tomento adpresso ac plerumque albo (raro flavido-brunneo), vel demum glabratae.

Foliar blades clothed irregularly and sparsely on lower surface (petioles and young shoots densely) with appressed and commonly white (rarely yellowish-brown) tomentum, or finally glabrate.

Specimens examined: *F. R. Fosberg* 13,402, tree, 5 meters tall, at edge of moist forest, alt. 600 meters, Manawai-Kahananui Ridge, Isl. Molokai, Dec. 24, 1936 (type, Field, 2 sheets: cotypes, Berl.; Bish.).

The type specimens lack flowers but have a total of ten mature fruits. These are identical with those of var. *spathulatum* proper found on Oahu (type locality for that variety) and the only distinctive character remaining appears to be that of the tomentum on the youngest shoots, on the under surfaces of the leaves, and on the petioles when young. The leaves and youngest shoots of var. *spathulatum* proper are regularly glabrous.

Pittosporum glabrum var. **spathulatum hypoleium** Degener & Sherff f. nov.—Formae *subcandido* similis sed pubescentia pro maxima parte flava.

Similar to f. *subcandidum* but the pubescence for the most part yellow. On the type the pubescence is accompanied by considerable pulverulence but this appears to be foreign.

Specimens examined: *Otto Degener & H. Ochiae* 10,988*a*, on exposed ridge in tapestry forest, ridge northeast of Nuuanu Pali, Isl. Oahu, Nov. 20, 1926 (type, Field).

The large spray of the type sheet lacks flowers but is accompanied by a mature capsule, this in a separate packet.

Pittosporum glabrum Tinifolium var. nov.—Rami glabrati, non robusti (pro speciminibus visis sub 5 mm. crassi). Folia ramorum apices versus disposita, novellissima valde pubescentia mox glabra vel infra sparsissime porrigini-setosa, graciliter petiolata petiolo 0.5–2 cm. longo, lamina oblanceolata vel oblonge elliptico-lanceolata, acuminata, membranacea, subobscure nervata, 6–11 cm. longa et 2–3.3 cm. lata. Flores ignoti. Inflorescentia fructifera caulina, subsessilis, cum ±5 capsulis. Capsula pedicellata pedicello 4–10 mm. longo; valvis demum planis et plus minusve rotundis, sub 2 cm. longis et 1.8 cm. latis, extus glabratis vel sparsim setosis sed (siccis) minute rugosis (sub vitro lenticulariformi multum convolutis), rostro circ. 1.5 mm. longo. Semina atra, plus minusve plana, angulata, faciebus glabra et sublaevia.

Branches glabrate, not robust (less than 5 mm. thick for the specimens seen). Leaves disposed toward tips of branches, youngest ones very pubescent but soon glabrous or on lower surface very sparsely scurfy-setose, slenderly petiolate, petiole 0.5–2 cm. long; blade oblanceolate or oblongly elliptic-lanceolate, acuminate, membranaceous, subobscurely nerved, 6–11 cm. long and 2–3.3 cm. wide. Flowers unknown. Inflorescence (with capsules) cauline, subsessile, capsules ±5. Capsule pedicellate, pedicel 4–10 mm. long; valves finally flat and more or less rounded, under 2 cm. long and 1.8 cm. wide, externally glabrate or sparsely setose but (at least when dry) minutely rugose (under a lens appearing much convoluted), beak about 1.5 mm. long. Seeds black, more or less flat, angulate, glabrous and smoothish on faces.

Specimens examined: *Charles N. Forbes* 1,668–*M*, on ridge at side of Kipakula, southeasternmost East Maui, Nov. 17, 1917 (type, Bish.: cotypes, Berl.; Field).

The type collection was in fruiting condition only and thus inadequate for a full description. The available data have therefore been set forth rather fully here, with the hope that they will aid in the collection of additional specimens in the type locality. The leaves are thinner than in most *P. glabrum* proper (which is unknown from Maui) and the scurfy-setose pubescence found scattered or in tiny patches on the lower leaf-surfaces suggests somewhat *P. glabrum* var. *spathulatum* f. *subcandidum* of southeasternmost Molokai. However, the capsules are smaller than in f. *subcandidum* and much less pubescent, in fact almost or essentially glabrous; also, the leaves are thinner.

Pittosporum Hosmeri Saint-Johnii var. nov.—Frutex ±1.8 m. altus. Folia submatura maturaque petiolo 1.5–3.5 cm. longa lamina 10–20 cm. longa et 4–7 cm. lata, utrinque glaberrima vel infra irregulariter sparsimque adpresso-setosa setis gracilibus acribus subrectis saltem demum albis. Flores subflavido-albi, fragrantissimi. Capsula matura aurantiaca, glabra, 3.6–4.6 cm. longa, 3.5–4.6 cm. crassa, 3–4 cm. lata. Semina 8–9 mm. longa et 6–6.5 mm. lata.

Shrub ±1.8 meters tall. Leaves submature and mature, petiole 1.5–3.5 cm. long; blade 10–20 cm. long and 4–7 cm. wide, on both surfaces very glabrous, or irregularly and sparsely appressed-setose beneath with slender, sharp, nearly straight, at least finally white setae. Flowers yellowish-white, very fragrant. Mature capsule orange-colored, glabrous, 3.6–4.6 cm. long, 3.5–4.6 cm. thick, 3–4 cm. wide. Seeds 8–9 mm. long and 6–6.5 mm. wide.

Specimens examined: *Harold Saint John, J. W. Coulter, E. Y. Hashimoto, & D. D. Mitchell* 11,442, shrub 6 feet tall, flowers creamy-white and very fragrant, ripe fruit orange-colored, alt. 4,000 feet, Puuwaawaa, Puu Hualalai, Isl. Hawaii, Dec. 30, 1931 (type, Bish.: cotypes, Berl.; Field).

While discovered in the same locality as that for the species proper, var. *Saint-Johnii* is different in its leaves. Incidentally, it is a shrub and perhaps does not become a tree. Its leaves are glabrous beneath or at most sparsely appressed-setose with white, straightish hairs; only when emerging from the bud are they closely rufous-pubescent. In the species proper, also in the var. *longifolium* Rock, the leaves are more or less permanently dense-tomentose beneath with a light to dark brown or reddish-brown wool.

Pittosporum insigne Fosbergii var. nov.—Frutex vel arbor 3–6 m. alta. Varietati *Lydgatei* similis sed differt: foliis saepius 3.5–5 cm. latis, supra plerumque magis coriaceis nitidisque ac rugosius reticulato-venulosis, novellis et rami parte terminali valde adpresso-hispidis demum glabrescentibus vel rarius (siccis fulvo- vel albo-) pubescentibus, lamina latiore et apicem versus minus attenuata; pedunculo sub 1.5 cm. longo.

Shrub or tree 3–6 m. tall. Similar to var. *Lydgatei* but differs: leaves more often 3.5–5 cm. wide, above commonly more coriaceous and glossy also more rugosely reticulate-veiny, the nascent ones also terminal portion of branch strongly appressed-hispid but finally glabrescent or more rarely (in dry state brown- or white-) pubescent, blade broader and toward apex less attenuate; peduncle under 1.5 cm. long.

Specimens examined (all from Isl. Molokai): *Lucy May Cranwell & Carl Skottsberg* 2,550, in bog, Pepeopae, Jul. 9, 1938 (Goth.); *Otto Degener* 10,958, in mossy rain-forest, near Puu o Wahaula, Apr. 17, 1928 (Berl.; Deg.; Field, 2 sheets); *Degener* 10,960, in rain-forest, west of Pepeopae, Apr. 12, 1928 (Berl.; Deg.; Field); *Charles N. Forbes* 445–*Mo*, Kalapamoa, August, 1912 (Bish.); *Joseph F. Rock* 6,164, on ridge back of Kamoku, March, 1910 (Arn.; Berl.; Bish.; Del.; Field; Kew); *Saint John, Baker, Coulter, Fosberg, & Yuncker* 12,511, tree 12 feet tall, in wet forest, alt. 3,900 feet, Puu o Kaeha, Kawela, Dec. 23, 1932 (Bish.; Field; Yunck.); *iidem* 12,604, shrub 10 feet tall, flowers below leaves on stem, on steep *pali* [Hawaiian for bluff, cliff, or precipice], in rain-forest, ridge between Hanalilolilo and Pepeopae, Waikolu Valley, Kawela, Dec. 25, 1932 (type, Bish.: cotype, Field); *Saint John, J. Dunn, William B. Storey* 13,258, tree 20 feet tall, on wooded ridge, alt. 2,400 feet, Kukuinui Ridge, Wailau Valley, Jul. 4, 1933 (Field).

This handsome shrub or small tree is named after Dr. F. R. Fosberg, one of the type collectors, out of grateful appreciation of his assistance in my studies on the Hawaiian species of *Pittosporum*. Dr. Fosberg, as a student in the Hawaiian Islands during recent years, collected, either individually or jointly with one or more other botanists, a vast quantity of invaluable herbarium material. All of his many *Pittosporum* specimens he placed at my disposal for study and determination.

In *P. insigne* proper, of Maui, some of the flowers are borne terminally, but in var. *Fosbergii* the flowers are apparently always, as indicated on the type label, cauline. In *P. insigne* var. *Hillebrandii*, which, like var. *Fosbergii*, inhabits eastern Molokai, the fruits are more smoothish and the leaves are usually thinner, also less rugose and glossy above. At times, however, specimens of var. *Hillebrandii* offer an approach in one or two of these three respects.

In most of the material the leaves have shed all or most of their pubescence but in a few collections this has persisted over half or more of the lower surface. These may be separated as:

Pittosporum insigne var. **Fosbergii pertinax** Degener & Sherff f. nov.—Varietati *Fosbergii* ipsi valde similis (floribus ignotis) sed foliorum faciebus inferioribus non vel plus minusve tarde glabrescens, setis numerosissimis albis valde adpressis demum saepe in tegimentum tenuissimum subporriginosum valde imperfectum hac atque illac coalescentibus.

Very similar to var. *Fosbergii* proper but with lower leaf-surfaces more or less tardily glabrescent, their very numerous white setae strongly appressed and finally often coalescing here and there into a very thin, somewhat scurfy, highly imperfect integument.

Specimens examined: *Otto Degener* 10,956, in moderately dry locality, ravine northwest of Puu Makaliilii, Molokai, May 21, 1928 (Field); *Degener* 10,959, in forest, ravine just south of Maunahui, Molokai, Apr. 15, 1928 (type, Field).

The specimens cited would seem sufficiently distinct from var. *Fosbergii* proper to warrant separate varietal status if the strikingly peculiar character of pubescence were more constant. Var. *Fosbergii* proper, however, shows at times small bits of the same scurfy pubescence that occurs here. Hence a separation of the two forms must depend upon the comparative amounts of pubescence on the mature leaves.

Pittosporum insigne var. **Hillebrandii** (Lévl.) comb. nov.; *Pittosporum Hillebrandii* Lévl. Fedde Repert. 10: 121. 1911.

Specimens examined (all from Isl. Molokai): *Otto Degener* 10,977, in open woods, near Brown's Ranch, eastern Molokai, Oct. 14, 1927 (Berl.; Deg.; Field); *Abbé Urbain Faurie* 10, Pukoo, May, 1910 (Arn.; Del.); Faurie 15, same locality and date (Arn.; Del., 2 sheets); *Faurie* 16, same locality, June, 1910 (Arn.; Del., 2 sheets); *Faurie* 17, same locality, May, 1910 (type, Par.: cotype, Bish.); *Charles N. Forbes* 299–*Mo*, same locality, July, 1912 (Berl.; Bish.; Field, 2 sheets); *F. R. Fosberg* 13,364, tree 5 meters tall, alt. 850 meters, in rain-forest, on sloping plateau east of Mapulehu Valley, December 23, 1936 (Bish.; Field); *Joseph F. Rock* 7,002, Wailau Pali, April, 1910 (Arn., 2 sheets; Berl.; Bish.; Field); *Rock* 7,007, same locality and date (Bish.).

Some specimens of var. *Hillebrandii* offer an illusory resemblance to *P. glabrum* var. *spathulatum* but must not be equated with that plant, since var. *Hillebrandii* has usually larger fruits (these more often oblong in outline, not more often broader than long), their faces more rugose and much less tomentose or even glabrate. Its leaf-habit, too, is usually somewhat different.

Pittosporum insigne micranthum var. nov.—Folia plerumque paulo minora lamina sub 11 cm. longa et sub 5 cm. lata, supra parce nitida. Inflorescentiae axis sub 2.5 cm. longus; bracteis lineari-subulatis tomentosis vel irregulariter glabratis 3–4 mm. longis; sepalis ovatis vel ovato-oblongis, tomentosis vel extus saepe

glabratis, circ. 2 mm. longis; corollae tubo tantum circ. 6–7 mm. longo, lobis circ. 2–2.5 mm. longis. Capsula minus rugosa, primum tomentosa mox subglabrata, ±2.3 cm. longa et ±1.5 cm. lata; seminibus atris, valde perspicueque tuberculatis, ±6.5 mm. longis et ±5.5 mm. latis.

Leaves commonly a little smaller, blade under 11 cm. long and under 5 cm. wide, scarcely glossy above. Axis of inflorescence under 2.5 cm. long; bracts linear-subulate, tomentose or irregularly glabrate, 3–4 mm. long; sepals ovate or ovate-oblong, tomentose or outwardly often glabrate, about 2 mm. long; corolla's tube only about 6–7 mm. long, lobes about 2–2.5 mm. long. Capsule less rugose, at first tomentose presently subglabrate, ±2.3 cm. long and ±1.5 cm. wide; seeds black, strongly and conspicuously tuberculate, ±6.5 mm. long and ±5.5 mm. wide.

Specimens examined: *Otto Degener* 10,963, in arid lava region, Ulupalakua, East Maui, June 23, 1927 (Berl.; Deg.; Field, 2 sheets); *Charles N. Forbes* 1,800–*M*, on south slope of Haleakala, Kanaio, East Maui, Mar. 1, 1920 (type, Bish.: cotypes, Berl.; Field).

Pittosporum insigne pelekunuanum var. nov.—Ramus (parte terminali sub 5 cm. longa visa) etiam gemma terminalis dense albido-tomentulosa. Folia (tantum 2 principalia visa) magna, petiolo ±2.3 cm. longo; lamina oblonga vel obovato-oblonga, apice breviter acuminata, basim versus subabrupte angustata, demum plus minusve glabrescenti (paucis setis reliquis solitariis vel confertis valde adpressis saepius argenteo-nitidis), ±2.9 dm. longa et ±9–10 cm. lata, supra sublaevi et non nitida. Capsula (unica matura visa) circumambitu oblonga, rugosa et sulcata, dense fulvo- vel albo-tomentulosa, circ. 2.2 cm. longa et circ. 1.6 cm. lata.

Branch (terminal portion less than 5 cm. long seen) also terminal bud densely whitish-tomentulose. Leaves (only two principal ones seen) large, petiole ±2.3 cm. long; blade oblong or obovate-oblong, at apex shortly acuminate, toward base subabruptly narrowed, finally more or less glabrescent (the few remaining setae solitary or clustered, much appressed, more often silvery-glossy), ±2.9 dm. long and ±9–10 cm. wide, above smoothish and not glossy. Capsule (a single mature one seen) oblong in outline, rugose and sulcate, densely brownish- or white-tomentulose, about 2.2 cm. long and about 1.6 cm. wide.

Specimens examined: *Charles N. Forbes* 586–*Mo*, Pelekunu Valley, Molokai, September, 1912 (type, Bish.).

In eastern Molokai *Pittosporum sulcatum*, through its var. *Remyi*, and *P. insigne*, through its vars. *Fosbergii* and *Hillebrandii*, tend to approach each other somewhat, possibly through hybridization. Thus, for example, several specimens referred to *P. sulcatum* var. *Remyi* (*e.g.*, Forbes 250–*Mo*) because of leaf characters have capsules more typical of the average ones found in *P. insigne* var. *Fosbergii*. Forbes 586–*Mo* represents, however, a plant that cannot well be accounted for as an intermediate. Its leaves are much too large to suggest either species. The type has two leaves left substantially intact and a portion of a third. They are so large as to suggest leaves of juvenile or second-growth shoots found in some other arborescent genera, but they are borne on an apparently normal, older branch. Then, too, they are accompanied by the single ripe and partly opened capsule (this unattached and filed in packet on sheet). We have also the consideration that Forbes was a careful collector and would doubtless never have obtained atypic leaves without making a note to that effect. It is unfortunate that no flowers were obtained, but on the basis of the evidence at hand the plant seems best construed as a very large-leaved variety of *P. insigne*, with the fruit densely tomentulose.

Pittosporum kahananum sp. nov.—Frutex laxus vel arbor patens. Folia numerosa ad et subverticillate infra ramorum apices conferta, sicca brunneo-viridia, petiolo glabro 0.8–2 cm. longo, lamina oblongo-obovata, coriacea, apice rotundata vel obtusa, margine revoluta, nascente dense adpresso-hispida, supra mox glabra atque impresse reticulato-venosa, infra subperspicue elevato-venosa et demum glabrescente vel moderate vel etiam densissime adpresso-hispida setis albis vel brunneis, 4–8 cm. longa et 1.2–2.5 cm. lata. Inflorescentiae caulinae et axillares, sessiles, 1–8-florae. Tantum flores masculini visi. Bracteae nunc ovatae nunc subulatae, pubescentes vel glabrescentes, sub 4 mm. longae. Pedicelli tomentosi, crassi, ±2 mm. longi. Sepala subanguste vel late ovata, apice acuminata vel obtusa, extus moderate adpresso-hispida, margine scariosa, 3.5–4.5 mm. longa. Petala 5 (raro 6), saepius distincta, alba, 12–13 mm. longa (parte terminali expansa oblonga ±4 mm. longa inclusa). Stamina gracilia, ±6.5 mm. longa, pistillo subaequalia vel etiam aequalia. Capsula (unica visa) ovoidea; valvis demum planis, basi subcordato-truncatis, extus valde rugosis et sulcatis aliter plus minusve glabris circ. 3.5 cm. longis et 2–2.3 cm. latis. Semina intense nigra, angulata et paulum scrobiculata, circ. 6.5–7 mm. longa, 5–5.5 mm. lata, 2.5–3 mm. crassa.

Loose shrub or spreading tree. Leaves numerous, clustered at and subverticillately below tips of branches, brownish-green when dry, petiole glabrous and 0.8–2 cm. long; blade oblong-obovate, coriaceous, at apex rounded or obtuse, at margin revolute, when nascent densely appressed-hispid, above presently glabrous and impressedly reticulate-veiny, below somewhat conspicuously salient-veiny and finally glabrescent or moderately or even very densely appressed-hispid with white or brown setae, 4–8 cm. long and 1.2–2.5 cm. wide. Inflorescences cauline and axillary, sessile, 1–8-flowered. Only staminate flowers seen. Bracts now ovate now subulate, pubescent or glabrescent, under 4 mm. long. Pedicels tomentose, thick, ±2 mm. long. Sepals subnarrowly or broadly ovate, at apex acuminate or obtuse, moderately appressed-hispid outside, at margin scarious, 3.5–4.5 mm. long. Petals 5 (rarely 6), more often distinct, white, 12–13 mm. long (including expanded terminal portion, this oblong and ±4 mm. long). Stamens slender, ±6.5 mm. long, subequal or even equal to pistil in length. Capsule (a single one seen) ovoid; valves finally flat, at base subcordate-truncate, externally very rugose and sulcate, otherwise more or less glabrous, about 3.5 cm. long and 2–2.3 cm. wide. Seeds intensely lustrous-black, angled and somewhat wrinkled, about 6.5–7 mm. long, 5–5.5 mm. wide, 2.5–3 mm. thick.

Specimens examined: *F. R. Fosberg* 12,248, loose shrub 1 meter tall, flowers cream-white, odor not pleasant, on steep, wet, exposed, bushy slope, alt. 750 meters, Waikane-Schofield Trail, Kahana, Isl. Oahu, Jul. 27, 1935 (Bish.; Field); *Harold Saint John* 10,152, spreading tree, flowers white, alt. 2,400 feet, near the divide, Waikane-Schofield Trail, Kahana, Jan. 19, 1930 (type, Bish.).

The leaf-shape and fruit are much the same as in *Pittosporum sulcatum*. The leaves are very different, however, in that many of them retain a usually dense coating of innumerable, more or less coalesced, white or brown hairs. *P. sulcatum* has glabrous adult leaves and its var. *Remyi* has at the most a very few hairs on the lower leaf-surfaces. *P. cauliflorum* var. *fulvum* is occasionally rather small-leaved and then may superficially resemble *P. kahananum*. That variety can be told at once, however, by the dense tomentum on the younger parts and often on the lower surfaces of the older leaves, also by the tomentose capsules. In *P. kahananum* the hairs are fewer and straighter, justifying the term hispid rather than tomentose, and the capsules are essentially glabrous (though rugose).

Pittosporum napaliense sp. nov.—Arbor ±6.5 m. alta, caule ±2 dm. crasso. Folia magna paucaque, alterna vel saepius subverticillate ad vel prope ramorum apices disposita, graciliter petiolata petiolo 2–5.5 cm. longo; lamina nunc oblanceolato-oblonga nunc late obovato-oblonga, apice obtusa vel breviter subacuminata, basi cuneata, submembranacea, supra coriacea saepe nitida mox glabra pallidaque venis non perspicue impressis, infra adpresso-setosa vel porrigini-strigosa setis acribus atque argenteo-albidis demum plus minusve glabrata, saepius 1.5–2 dm. longa et 5–8.5 cm. lata. Inflorescentia subumbelliformis nunc terminalis nunc axillaris vel caulina, dense tomentosa, pedunculo plerumque 1–3 (rarius usque ad 5) cm. longo. Flores numerosi (saepe 20–30), pedicellis 3–7 mm. longis. Bracteae nunc ovato-lanceolatae nunc lanceolato-lineares, 4–8 mm. longae. Sepala tomentosa late ovata, obtusa, 4–5.5 mm. longa. Corolla glabra, tubo tantum circ. 7–8 mm. longo, lobis patentibus ovatis ±5 mm. longis. Ovarium anguste ovatum, dense tomentosum, 3–4 mm. longum; stylo subaequaliter longo, prope apicem glabro. Stamina sterilia circ. 3–3.5 mm. longa, fertilia ignota. Capsula tantum circ. 1.5 cm. longa (stylo gracili circ. 3.5 mm. longo excluso) et lata, moderate obcompressa, utrinque truncata vel subcordata, tomento griseo-brunneo brevi denso vestita vel demum irregulariter glabrescens nigrescensque. Semina nigra, irregulariter angulata, 5.5–6.5 mm. longa.

Tree ±6.5 meters tall, stem ±2 dm. thick. Leaves large and few, alternate or more often subverticillately disposed at or near tips of branches, slenderly petiolate, petiole 2–5.5 cm. long; blade now oblanceolate-oblong now widely obovate-oblong, at apex obtuse or shortly subacuminate, at base cuneate, submembranaceous, above coriaceous often glossy presently glabrous and pallid with veins not conspicuously impressed, below appressed-setose or scurfy-strigose with sharp and silvery-whitish setae but finally more or less glabrate, more often 1.5–2 dm. long and 5–8.5 cm. wide. Inflorescence subumbelliform, now terminal now axillary or cauline, densely tomentose, peduncle commonly 1–3 (more rarely up to 5) cm. long. Flowers numerous (often 20–30), pedicels 3–7 mm. long. Bracts now ovate-lanceolate now lanceolate-linear, 4–8 mm. long. Sepals tomentose, widely ovate, obtuse, 4–5.5 mm. long. Corolla glabrous, tube only about 7–8 mm. long; lobes spreading, ovate, ±5 mm. long. Ovary narrowly ovate, densely tomentose, 3–4 mm. long, subequal to style in length, glabrous near apex. Stamens: sterile about 3–3.5 mm. long, fertile unknown. Capsule only about 1.5 cm. long (excluding the slender style, this about 3.5 mm. long)

and wide, moderately obcompressed, at both ends truncate or subcordate, clothed with dense short gray-brown tomentum or finally irregularly glabrescent and darkening. Seeds glossy-black, irregularly angulate, 5.5–6.5 mm. long.

Specimens examined: *Otto Degener & Emilio Ordoñez* 12,616, forest tree, 20 feet tall, Hanakoa, Napali Coast, Isl. Kauai, Dec. 24, 1939 (Berl.; Deg.; Field, 3 sheets); *Harold Saint John & F. R. Fosberg* 13,864, tree, 20 feet tall, trunk 8 inches in diameter, leaves firm, clear-green above, silvery-green beneath, common in moist woods, alt. 500 feet, Hanakapiai, Hoolulu Stream, Napali District, northwest Kauai, Dec. 30, 1933 (type, Bish.: cotypes, Berl.; Field, 2 sheets; Kew).

Easily recognized by its large, thinnish leaves, which are more or less whitish-strigose beneath, its proportionately large calyces or small corollas, and its small capsules. These last are somewhat tuberculate-rugose if and when they shed their tomentum, but do not become deeply grooved; their valves finally have at most a shallow, median, lengthwise furrow.

Pittosporum sulcatum Rumicifolium var. nov.—Frutex forsitan interdum arbuscula ±2.5 m. alta. Folia numerosa ad ramorum apices disposita, sicca brunneo-viridia, petiolo gracili 1.5–3.5 cm. longo, lamina anguste spathulato-oblanceolata, apice acuta vel sensim attenuata, basi elongate attenuata, supra coriacea et minute impresso-reticulata, infra manifeste elevato-venosa, primum (immaturissima) dense adpresso-pilosa mox glabrata vel glabra, 6–13 cm. longa et 1–2.5 cm. lata. Flores ignoti. Pedunculi caulini vel terminales demum usque ad 5 vel 8 mm. longi, pedicellis 3–6 mm. longis. Capsula glabra glabratave; valvis 1.8–2.5 cm. longis latisque.

Shrub or perhaps at times a small tree, ±2.5 meters tall. Leaves numerous, disposed at tips of branches, brownish-green when dry, petiole slender and 1.5–3.5 cm. long; blade narrowly spatulate-oblanceolate, at apex acute or gradually attenuate, at base elongately attenuate, above coriaceous and minutely impressed-reticulate, below manifestly salient-veiny, at first (when very immature) densely appressed-pilose, presently glabrate or glabrous, 6–13 cm. long and 1–2.5 cm. wide. Flowers unknown. Peduncles cauline or terminal, finally up to 5 or 8 mm. long, pedicels 3–6 mm. long. Capsule glabrous or glabrate; valves 1.8–2.5 cm. long and wide.

Specimens examined: *Otto Degener* 11,005 *pro parte*, in sunny rain-forest, above Pauoa Flats, Honolulu, Isl. Oahu, Jul. 3, 1923

(N.Y.); *F. R. Fosberg* 8,973, bush 2.5 meters tall, in wet forest, alt. 680 meters, peak at head of Pauoa Flats, Pauoa, Oct. 30, 1932 (type, Field); *Joseph F. Rock* 10,073, Manoa Valley, Oahu, September, 1912 (Bish.; Gray).

In its more slender and somewhat more congested leaves, this variety appears sufficiently separable from *P. sulcatum* proper, to which it is allied in its glabrous or glabrate capsules. In the shape of its leaves, however, it is closer to var. *Remyi*.

Pittosporum dolosum sp. nov.—Arbor ±5 m. alta. Folia terminaliter conferta, saepe suberecta, sicca brunneo-viridia vel rufulo-brunnea, petiolo 1–3 cm. longo, lamina spathulato-obovata, basi subelongato-cuneata, apice plus minusve acuminata, facie superiore mox glabra subcoriacea saepe nitida minute impresso-reticulata, margine minute ac saepe grosse revoluta, facie inferiore manifeste elevato-venosa primum (juvenissima) hispida mox fere glabrata sed plerumque sparsissime adpresso-setosa, 8–12 cm. longa et 2–4.3 cm. lata. Inflorescentia ±5-flora, caulina vel raro terminalis. Pedunculus tomentosus, 4–6 mm. longus; bracteis linearisubulatis, subglabratis, sub 5 mm. longis; pedicellis tomentosis, 3–5 mm. longis. Sepala ovata, pubescentia, 3–5 mm. longa. Corollae tubus 7–9 mm. longus, lobis circ. 5 mm. longis. Capsula oblongo-ovoidea vel cordato-ovoidea, rugosa sulcataque, demum glabrata vel sparsissime pubescens, 1.6–2.7 cm. longa stylo persistente ±3 mm. longo excluso et ±2 cm. lata. Semina atra, plana vel subplana, laevia, 7–8 mm. longa.

Tree ±5 meters tall. Leaves crowded at tips of branches, often suberect, brownish-green or reddish-brown when dry, petiole 1–3 cm. long; blade spatulate-obovate, at base subelongate-cuneate, at apex more or less acuminate, at margin minutely also often coarsely revolute, 8–12 cm. long and 2–4.3 cm. wide; upper surface presently glabrous, subcoriaceous, often glossy, minutely impressed-reticulate; lower surface manifestly salient-veiny, at first (when very young) hispid, presently almost glabrate but commonly very sparsely appressed-setose. Inflorescence ±5-flowered, cauline or rarely terminal. Peduncle tomentose, 4–6 mm. long; bracts linear-subulate, subglabrate, under 5 mm. long; pedicels tomentose, 3–5 mm. long. Sepals ovate, pubescent, 3–5 mm. long. Corolla's tube 7–9 mm. long, lobes about 5 mm. long. Capsule oblong-ovoid or cordate-ovoid, rugose and sulcate, finally glabrate or very sparsely pubescent, 1.6–2.7 cm. long (the persistent, ±3 mm. long style excluded) and ±2 cm. wide. Seeds black, flat or flattish, smooth, 7–8 mm. long.

Specimens examined (all from Isl. Oahu): *Otto Degener, Kwan Kee Park, & Manuel Kwon* 11,003, in rain-forest, Pig-God Trail, Punaluu, Jan. 17, 1932 (Deg.; Field; with foliar aspect of *P. sulcatum* and perhaps hybridized); *Abbé Urbain Faurie* 9, alt. 800 meters, Punaluu, May, 1910 (Arn.; Del.); *Charles N. Forbes,* between Punaluu and Kaipapau, Koolauloa Mts., Nov. 14–21, 1908 (Bish.); *Forbes & Dr. C. M. Cooke, Jr.,* same locality, May 3–8, 1909 (Berl.; Bish.; Field); *Forbes,* with *C. L. Thompson,* same locality, May 8–13, 1909 (Berl.; Bish.; Field); *F. R. Fosberg* 9,540, tree 5 meters tall, in wet forest, alt. 740 meters, divide between Kahana and Waianae Uka, Waikane-Schofield Trail, May 14, 1933 (Bish.; Field, 2 sheets); *Joseph F. Rock,* Koolau Mts., 1908 (Arn.); *Rock* 23 (173), same locality, Dec. 3–14, 1908 (Field); *Rock* 23 (392), Punaluu, Dec. 24–29, 1908 (Field); *Rock* 23 (781), same locality, Dec. 3–14, 1908 (Kew); *Rock* 170, Punaluu Mts., Dec. 3–14, 1908 (Bish.); *Rock* 418, same locality, Dec. 24, 1908 (type, Gray: cotype, Bish.); *Rock* 535, above the Valley of Kaliuwaa, Punaluu, Dec. 24, 1908 (Arn.); *Harold Saint John* 10,584, on crest of ridge, alt. 2,200 feet, Punaluu, Sept. 28, 1930 (Bish.; N.Y.); *Olof H. Selling* 3,676, Punaluu, Sept. 27, 1938 (Goth.).

Rock, who had collected this species in the vicinity of Punaluu, northeastern Oahu, referred it to *P. spathulatum* Mann, by which he meant the recently named *P. sulcatum.* From typical *P. sulcatum* it differs in having its leaves mostly with a few scattered, appressed hairs on the lower surface, their venation usually more pronounced, their color usually more brownish or reddish-brown when dried, their position more nearly ascending or erect and their arrangement more compact, their margins more often loosely rolled underneath (independently of and in addition to the minute revoluteness present in most *Pittosporum* species), etc. The hairs of the lower surface may be lacking on several leaves but nearly always show on some, now toward the base now toward the tip but more consistently along the midvein. The geographic distribution appears restricted to the mountains of the Land-Section Punaluu and of the area slightly southwest.

Pittosporum dolosum aquilonium var. nov.—Frutex ±2 m. altus forsitan arbuscula. Folia elongatiora, petiolo usque ad 4 cm. longo, lamina usque ad 2 dm. longa et 5 cm. lata, apice saepius acuminata. Ovarium dense tomentosum. Capsula matura subglabrata.

Shrub ±2 meters tall or perhaps becoming a small tree. Leaves more elongate, petiole up to 4 cm. long; blade up to 2 dm. long and 5 cm. wide, at apex more often acuminate. Ovary densely tomentose. Mature capsule subglabrate.

Specimens examined (all from Isl. Oahu): *Otto Degener, Emilio Ordoñez, & J. Kepaa* 12,779, in woods, Peahinaia Trail, Apr. 28, 1940 (Deg.; Field); *F. R. Fosberg* 8,850, bush, 2 meters tall, in wet forest, alt. 500 meters, South Ridge, South Helemanu Gulch, Paalaa, Koolau Mts., Sept. 25, 1933 (Bish.; Field); *Frank Kitamura*, on open, moist slope, alt. 1,450 feet, ridge of South Opaeula Gulch, Paalaa, Sept. 24, 1933 (Bish.); *Harold Morley* 19, in moderate forest, alt. 1,600 feet, ridge south of South Opaeula Gulch, Paalaa, Sept. 24, 1933 (Bish.); *Amy Suehiro*, South Opaeula Ridge, Sept. 25, 1935 (type, Bish.).

The leaves commonly retain a few appressed setae close to the midvein, on the lower surface, and thus suggest *P. sulcatum* var. *Remyi*. They average much larger, however, than in that variety; moreover, the mature capsules are subglabrate, not pubescent, in most of the large and small surface grooves. They are approached in size by those found on some specimens of *P. sulcatum* proper of the Kaala region in Oahu. The numerous Kaala specimens examined for *P. sulcatum* proper, however, invariably have the leaves glabrous on both surfaces when mature. The foliar habit seems to place the type plant most logically as a variety under *P. dolosum*, from which it can be told easily by its larger leaves. These have blades mostly 12–20 cm. not 8–12 cm. long. Var. *aquilonium*, furthermore, grows considerably west of the divide of the Koolau Mountains, while *P. dolosum* itself grows on the eastern side.

Pittosporum Forbesii sp. nov.—Rami novelli pubescentes. Folia numerosa, ramorum apices versus conferta, petiolata petiolo subgracili 5–13 mm. longo; lamina obovata vel late oblongo-oblanceolata, apice obtusa vel rotunda, basi cuneato-angustata, plerumque 5–8 cm. longa et 1.8–3 cm. lata, primum dense tomentosa tomento rufo-brunneo vel mox argenteo, demum supra (rarius etiam infra) irregulariter vel omnino glabra. Flores ignoti. Inflorescentiae fructiferae caulinae, breviter (circ. 5–7 mm.) pedunculatae, pedicellis tantum 1–3 mm. longis. Capsula parva, 1.5–2 cm. longa, circumambitu oblongo-ovata; valvis demum planis, obovatis, sub 2 cm. latis, extus primum tuberculatis ac dense albido-tomentosis demum fere glabratis et non tuberculatis sed sub vitro lenticulariformi multum minuteque convolutis. Semina intense atra, crassa, 4–5 mm.

longa, omnino vel faciebus exceptis rugosa convolutaque. Stylus primum vix 2 mm. longus, demum (pro capsulae rostro) circ. 1–1.5 mm. longus.

Nascent branches pubescent. Leaves numerous, crowded toward tips of branches, their somewhat slender petiole 5–13 mm. long; blade obovate or widely oblong-oblanceolate, at apex obtuse or rounded, at base cuneate-narrowed, commonly 5–8 cm. long and 1.8–3 cm. wide, at first densely tomentose with reddish-brown or presently silvery tomentum, finally above (more rarely also below) irregularly or entirely glabrous. Flowers unknown. Fruit-bearing inflorescences cauline, shortly (about 5–7 mm.) pedunculate, pedicels only 1–3 mm. long. Capsule small, 1.5–2 cm. long, in outline oblong-ovate; valves finally flat, obovate, under 2 cm. wide, outwardly at first tuberculate and densely whitish-tomentose finally almost glabrate and not tuberculate but under a lens much and minutely convoluted. Seeds intensely black, thick, 4–5 mm. long, rugose and convoluted all over unless on faces. Style at first scarcely 2 mm. long, finally (as a capsular beak) about 1–1.5 mm. long.

Specimens examined: *Charles N. Forbes* 122–*Mo*, on slopes of Puu Kolekole, Molokai, July, 1912 (type, Bish.).

Probably best regarded as a sister species to *Pittosporum Terminalioides*, a species not known as yet from the Island of Molokai. Indeed, the collector, Mr. Forbes, wrote of it on the type sheet: "Probably related to *P. terminaloides* [*sic*]. May be new. Glabrous small capsule. No flowers yet." *P. Terminalioides* is a species which usually can be identified rather easily and yet which varies so much in most of its characters as to invalidate most positions assigned to it in a key. It is probably best separated from *P. Forbesii*, aside from geographic considerations, by the upper surfaces of the leaves. These as a rule are soon glabrous or glabrate, while in *P. Forbesii* most of the upper leaf-surfaces retain over considerable areas a thin coating of densely matted, silvery hairs.

The species is gratefully dedicated to Mr. Forbes, who, before his unfortunate death some twenty years ago, had greatly assisted my studies with the collection and lending of numerous Hawaiian specimens.

Pittosporum argentifolium sp. nov.—Verisimiliter arbor parva. Folia subverticillate ad propeque ramorum apices disposita, oblongo-obovata vel -spathulata, crassiuscula, apice aegre acuminata, basi in petiolum gracilem circ. 2–3 cm. longum angustata, primum (saltem facie inferiore) densissime strigoso-tomentosa (pilis

fulvis argenteisve), demum supra glabrata et impresso-venosa infra densissime strigoso-tomentosa vel porrigini-strigosa (pilis argenteo-albis et saepe in integumentum tenuissimum partim transformatis) vel pro minima parte glabrata, lamina 1–2.5 dm. longa et 3–7 cm. lata. Inflorescentiae raro terminales plerumque axillares vel secundum ramos dispositae, tomentosae, superiores sessiles multi- (±20-) florae axe usque ad circ. 1.5 cm. longo, inferiores pauci- (±10-) florae pedunculatae pedunculo 1–2 cm. longo. Pedicelli 3–6 mm. longi; bracteis lineari-subulatis, circ. 7–8 mm. longis. Sepala ovata, fulvo- vel albo-tomentosa, ±4 mm. longa. Corollae tubus ±6 mm. longus. Capsula obcompressa, circumambitu horizontaliter oblonga, ±2 cm. longa et ±2.6 cm. lata; valvis extus non vel vix dorsali-depressis, minutissime tomentellis, parce rugulosis (itaque *P. glabri* var. *spathulati* valvis valde similibus).

Probably a small tree. Leaves disposed subverticillately at and near the tips of the branches, oblong-obovate or -spatulate, somewhat thickish, at apex weakly acuminate, at base narrowed into a slender petiole about 2–3 cm. long, at first (at least on lower face) very densely strigose-tomentose (with brown or silvery hairs), finally on upper surface glabrate and impressed-veiny but on lower surface very densely strigose-tomentose or scurfy-strigose (hairs silvery-white and often partly transformed into a very thin integument) or for a very small part glabrate, blade 1–2.5 dm. long and 3–7 cm. wide. Inflorescences rarely terminal, commonly axillary or variously disposed along branches, tomentose; upper ones sessile, many- (±20-) flowered, axis up to about 1.5 cm. long; lower ones few- (±10-) flowered, pedunculate, the peduncle 1–2 cm. long. Pedicels 3–6 mm. long; bracts linear-subulate, about 7–8 mm. long. Sepals ovate, brown- or yellow-tomentose, ±4 mm. long. Corolla-tube ±6 mm. long. Capsule obcompressed, in outline horizontally oblong, ±2 cm. long and ±2.6 cm. wide; valves externally not or scarcely dorso-depressed, very minutely tomentellous, slightly rugulose (thus strongly similar to the valves of *P. glabrum* var. *spathulatum*).

Specimens examined: *William Hillebrand* 304, Mt. Haleakala, East Maui (Kew); *Joseph F. Rock* 8,656, alt. 3,000 feet, Auahi (Auwahi), East Maui, November, 1910 (type, Arn.: cotypes, Arn.; Berl.; Bish.; Field, 2 sheets; Gray).

This is undoubtedly the same plant as that "collected by Lydgate on the south side of Haleakala" and cited by Hillebrand (Fl. Haw. Isls. 27. 1888) for his "*β* var.? *argenteum*" which he placed under

his new *Pittosporum hawaiiense*, described from the forests of Kona and Kohala of the Island of Hawaii. *P. hawaiiense* was the tenth and last species of *Pittosporum* in Hillebrand's text. His ninth species was *P. confertiflorum* Gray, to which this is closer in most respects. In fact, Rock had labeled his collection of no. 8,656 (*i.e.*, the type collection of *P. argentifolium*), *P. confertiflorum* (on label of type in Arn.). Hillebrand, long previous to writing his Flora of the Hawaiian Islands (and at least prior to July, 1865), had likewise labeled his own no. 304 as *P. confertiflorum*.[1] From *P. confertiflorum*, *P. argentifolium* differs at once in its mostly larger leaves and in having the young shoots not conspicuously tawny- or brown-tomentose, but, instead, rather moderately whitish-strigose. The pedicels of *P. argentifolium* are 3–6 not 6–12 mm. long, and the leaves in age have underneath a thinner investiture of pubescence. This consists of hairs that are less curved, more appressed, and at times passing more or less into a membranous scurf that in places may eventually slough away.

Pittosporum argentifolium sessile var. nov.—Folia saepe paulo minora, pubescentia faciei inferioris magis porriginosa etiam cuti non dissimili. Flores non vel brevissime (±2 mm.) pedicellati, pedunculo saepius brevi et sub 5 mm. longo. Capsulae valvae demum obcordatae, plus minusve tomentellae, planae vel undulatae sed non valde rugosae vel tuberculatae.

Leaves often a little smaller, pubescence of lower surface more scurfy and even similar to a cuticle. Flowers not or very shortly (±2 mm.) pedicellate, peduncle more often short and under 5 mm. long. Capsular valves finally obcordate, more or less tomentellous, flat or undulate but not strongly rugose or tuberculate.

Specimens examined: *Charles N. Forbes* 1,786–*M*, Kanaio, south slope of Haleakala, East Maui, Mar. 1, 1920 (Berl.; Bish.; Del.; Field); *Forbes* 1,964–*M*, Auwahi, south slope of Haleakala, Mar. 14, 1920 (Berl.; Bish.; Field; Gray); *Forbes* 1,981–*M*, south slope of Haleakala, Mar. 15, 1920 (Bish.); *Forbes* 2,052–*M*, flowers cream-white, very fragrant, Auwahi, Mar. 20, 1920 (Berl.; Bish.; Field); *Forbes* 2,062–*M*, Pakiloi, south slope of Haleakala, Mar. 23, 1920 (Bish.); *Forbes* 2,064–*M*, same place and date (type, Bish.).

Very similar to the species proper, except in its more or less sessile florets and fruits, these clustered on a commonly very short pedun-

[1] That Hillebrand failed to mention his own no. 304 in publishing the name *argenteum* may be explained by the fact that his plant had been sent to the Hooker Herbarium (where it was received in July, 1865, and later accessioned in the Kew Herbarium) and was therefore not at hand.

cle. Rarely one or two fruiting pedicels have elongated to about 6 mm.

Pittosporum argentifolium Rockii var. nov.—A specie ipsa capsulis grosse tuberculatis vel rugosis circumambitu ovatis vel cordato-ovatis ±2.3 cm. longis et ±2 cm. latis differt.

Unlike the species proper in its grossly tuberculate or rugose capsules, these ovate or cordate-ovate in outline, ±2.3 cm. long and ±2 cm. wide.

Specimens examined: *Charles N. Forbes,* mountains above Ukulele, East Maui (Bish.); *Forbes* 192–*M,* in woods near Ukulele, above Olinda, July, 1910 (Bish.); *Joseph F. Rock,* Haleakala, above Ukulele, September, 1910 (Gray); *Rock* 8,610, Ukulele, October, 1910 (type, Arn.: cotypes, Arn.; Berl.; Bish.; Del.; Field, 2 sheets; N.Y.); *Gerrit P. Wilder,* Maui, 1913 (Bish.).

Rock, for whom this variety is named, had labeled one of his specimens (Herb. Gray) *P. confertiflorum,* a species to which he had referred also, as above seen, specimens of *P. argentifolium* proper. In his Indigenous Trees of the Hawaiian Islands (p. 161. 1913) he states: "The capsules of *P. confertiflorum* from the various localities have all possible shapes and forms, but can not be separated successfully into varieties. It will have to remain a polymorphous species." The specimens of *P. argentifolium* proper all were collected, so far as definitely known, at or near Auwahi, near the west end of the southern slope of Mt. Haleakala, in East Maui. Their capsules are of the smoothish (*i.e.,* not rugose or strongly tuberculate) type such as is found in *P. glabrum* and its var. *spathulatum.* The specimens here segregated as var. *Rockii* came from the other side of the same mountain, at the junction of the northeast and northwest slopes. These have capsules of the rugose or strongly tuberculate type such as is found in *P. sulcatum.* Moreover, the capsules are ovate or cordate-ovate in outline, not, as in the species proper, transversely oblong. It seems that the two sets of plants are varietally different, regardless of whatever polymorphism may be proved to exist among the capsules of true *P. confertiflorum.*[1]

Pittosporum cladanthum gracilipes var. nov.—Foliorum tenuiorum obovatorum vel spathulato-obovatorum magnitudine

[1] Rock (*loc. cit.*) omits all mention of *P. hawaiiense* "var. β? *argenteum*" Hillebr., which, as already remarked above, was undoubtedly equivalent to *P. argentifolium* proper. It may therefore be assumed that Rock overlooked the other characters that are associated with those of the capsules in these two endemic groups of specimens, namely, *P. argentifolium* and its var. *Rockii.*

varietati *reticulato* venis pubescentiaque var. *fulvo* similis; lamina 6–12 cm. longa et 2.5–5 cm. lata. Flores (multi feminei visi) in inflorescentia graciliter pedunculata pedunculo 1–1.7 cm. longo et primum vix 1 (quamquam demum ±4) mm. crasso, sessiles, breves; sepalis acutis; corolla tantum circ. 6–7 mm. longa (parte dilatata subrotunda terminali petalorum separatorum ±2.5 mm. inclusa). Capsula (unica matura visa) moderate rugosa, dense tomentulosa, circ. 2 cm. longa (rostro excluso) et vix 1.8 cm. lata, seminibus circ. 5–6 mm. longis.

Similar in size of the thin, obovate or spatulate-obovate leaves to var. *reticulatum* but in their veins and pubescence to var. *fulvum;* blade 6–12 cm. long and 2.5–5 cm. wide. Flowers (many pistillate ones seen) short, sessile, in a slenderly pedunculate inflorescence, peduncle 1–1.7 cm. long and at first scarcely 1 (but finally ±4) mm. thick; sepals acute; corolla only about 6–7 mm. long including the terminal portion (this dilated, subrotund, ±2.5 mm. long) of the separate petals. Capsule (a single mature one seen) moderately rugose, densely tomentulose, about 2 cm. long (beak excluded) and scarcely 1.8 cm. wide; seeds about 5–6 mm. long.

Specimens examined: *Charles N. Forbes* 380–*L*, Isl. Lanai, September, 1917 (type, Bish.: cotypes, Berl.; Field).

Pittosporum confertiflorum longipes var. nov.—Folia lamina 9–17 cm. longa et 3.5–6.5 cm. lata, supra demum glabrata venis exceptis infra perspicue venosa ac brunneo- vel rufo-brunneo-tomentosa, apice acuminata. Flores ignoti. Inflorescentia terminalis vel demum subterminalis, laxe racemosa, ±15-flora, dense brunneo-tomentosa, axe 2–7 cm. longo (pedunculo gracili usque ad ±3.5 cm. longo incluso), pedicellis gracilibus plerumque 1.3–3.3 cm. longis. Capsula ignota.

Leaf-blade 9–17 cm. long and 3.5–6.5 cm. wide, on upper surface finally glabrate excepting for the veins, on lower surface conspicuously veiny and brown- or reddish-brown-tomentose, at apex acuminate. Flowers unknown. Inflorescence terminal or finally subterminal, loosely racemose, ±15-flowered, densely brown-tomentose, its axis 2–7 cm. long (including slender, up to ±3.5 cm. long peduncle), pedicels slender and commonly 1.3–3.3 cm. long. Capsule unknown.

Specimens examined: *Charles N. Forbes* 28–*M*, on ridges behind Lahaina, West Maui, May, 1910 (type, Bish.: cotype, Field).

The type had been labeled at Bishop Museum as a new species, with the observation that it was probably related to *Pittosporum*

confertiflorum. The leaf-characters combined with a terminal or subterminal inflorescence suggest *P. confertiflorum* var. *Mannii*, but the elongate peduncles, inflorescence-axes, and pedicels separate it at once from that variety. The type has a cluster of five peduncles at the tip of a single branch, each peduncle with several or many pedicels. The cotype has one originally terminal inflorescence and, about 1.5 cm. lower, an axillary inflorescence. As happens in so many forms of *Pittosporum*, a subsequently developed terminal or subterminal shoot has left the upper inflorescence on the cotype subterminal. This shoot has some leaves nearly full-grown but still retaining over most of their upper surface the original brownish tomentum. The older leaves lower down, however, have become completely glabrous above except along some of their veins.

It is unfortunate that flowers and fruits are not at hand. Until they can be had, some doubt must exist, of course, as to the wisdom of assigning this form a varietal status next to var. *Mannii*, or indeed under *P. confertiflorum* at all.

Pittosporum acuminatum waimeanum var. nov.

Folia tenuiora, lamina saepe 1.3–1.7 dm. longa et 4–6.5 cm. lata, non nitida, venulis supra obscuris; petiolo gracili 1–3.5 cm. longo; pedunculis gracilibus plerumque 1–3.5 cm. longis, pauciter (saepius 1- vel 2-) bracteatis bracteis anguste subulatis 3–5 mm. longis; sepalis late ovatis, magne ex parte brunneo-pubescentibus, circ. 3 mm. longis; capsula fere omnino brunneo-pubescenti.

Leaves thinner, blade often 1.3–1.7 dm. long and 4–6.5 cm. wide, not glossy, the small nerves obscure above; petiole slender, 1–3.5 cm. long; peduncles slender, commonly 1–3.5 cm. long, few- (more often 1- or 2-) bracteate; bracts narrowly subulate, 3–5 mm. long; sepals widely ovate, over much of their surface brown-pubescent, about 3 mm. long; capsule brown-pubescent nearly all over.

Specimens examined: *Abbé Urbain Faurie* 3, at altitude of 1,000 meters, Waimea, Isl. Kauai, March, 1910 (type, Par.: cotypes, Arn.; Bish.; Del.).

Pittosporum Terminalioides lanaiense var. nov.—Folia obovata, lamina 6–8 cm. longa et 2–4 cm. lata, petiolo ±1 cm. longa. Pedunculus demum usque ad circ. 2.6 cm. longus, floribus subsessilibus. Capsulae minores, valvis circ. 1.5 cm. longis latisque, parce rugulosis, tomentellis, non sulco mediano longitudinaliter canaliculatis.

Leaves obovate, blade 6–8 cm. long and 2–4 cm. wide, petiole ±1 cm. long. Peduncle finally up to about 2.6 cm. long, the flowers subsessile. Capsules smaller; valves about 1.5 cm. long and wide, scarcely rugulose, tomentellous, lacking a lengthwise, median furrow.

Specimens examined: *George C. Munro* 333, Paoma, Isl. Lanai, April 18, 1914 (type, Bish.); *Munro* 428, same locality and date (Bish.).

The specimens cited had been labeled for *P. Terminalioides* but are apparently quite distinct from the numerous specimens of *P. Terminalioides* examined from Hawaii (to which island the typical form of that species seemingly is restricted). The leaves are proportionately broader and seem consistently small. The capsules are small and lack the shallow, lengthwise, median furrow that usually runs along each valve in the species proper.

Euphorbia Deppeana Boiss. *in* DC. Prodr. 15[II]: 12. 1862; *Anisophyllum californicum* Kl. & Gke. Abh. Akad. Berl. Phys. 1859: 36. 1860 (*non* Bth.); *Euphorbia pauciflora* Nutt. *ex* Seem. Fl. Vit. 1: 216. 1865–68 (*non* Duf. *nec* Hill); *Euphorbia festiva* Sherff, Bot. Gaz. 97: 589. 1936; *Chamaesyce festiva* (Sherff) Croiz. & Deg. *ex* Deg. Fl. Haw. Dec. 9, 1936.

This species is close to *Euphorbia multiformis* var. *microphylla* Boiss. but appears to differ sufficiently in its leaves, these being at base broadly subcordate or even moderately cordate, on each margin commonly very obsoletely 1–8-denticulate. In *E. multiformis* var. *microphylla* the leaves are more or less cuneately narrowed at base and at the margins entire. As previously remarked by me (*loc. cit.*), Nuttall had designated a plant collected by him on the Island of Oahu as the type of a new species, *E. pauciflora* Nutt. (*nec aliorum*). Later, Boissier, apparently overlooking the minute foliar teeth and broader, more cordate leaf-bases, determined the Nuttall plant as *E. multiformis* H. & A. In his subsequent revision of *Euphorbia* for De Candolle's Prodromus, however, Boissier set off a specifically equivalent specimen as *E. Deppeana* (p. 12). This latter specimen had been collected by Deppe and was labeled as having come from California. This citation of habitat clearly was erroneous, as indeed Boissier suspected, for he wrote: "Annon potius ex similitudine cum praecedentibus [3 speciebus sandwicensibus].... Sandwicensis?"

Several years ago, during my revisional study of the Hawaiian species of *Euphorbia*, the Berlin type of *E. Deppeana* was inaccessible to me, it having been lent elsewhere, among the supposedly North

American specimens of the genus, for another revisional study. The assumption was made perforce, therefore, that the plant collected by Nuttall must be specifically different from *E. Deppeana* Boiss., especially so since Boissier himself had reduced the Nuttall plant to *E. multiformis* but had proposed as new, *E. Deppeana*. Recently, Dr. Louis C. Wheeler, of the American University, very kindly informed me that the Berlin type of *E. Deppeana* was still extant, though still on loan, and that a fragment was at Field Museum of Natural History. Mr. C. A. Weatherby, of Gray Herbarium, has now supplied me with an excellent photograph of the type sheet and fortunately the Field Museum type fragment (formerly in Dr. C. F. Millspaugh's private herbarium) has been found (deposited, as might have been expected, *among the United States specimens*) and compared with it. They are not different from *E. festiva*, which must, therefore, fall into synonymy. It is interesting to note, in passing, that this rare or perhaps no longer extant species of the Hawaiian flora must henceforth commemorate the name of Ferdinand Deppe, who was known because of his Mexican collections and who seems never to have visited the Hawaiian Islands.

Euphorbia multiformis var. **manoana** Sherff, Bot. Gaz. 97: 591. 1936.

In my monographic revision of the *Euphorbiae* of the Hawaiian Islands (Ann. Missouri Bot. Gard. 25: 1–75, pls. 2–11. 1938) the distribution of this variety was given as "Oahu, Lanai, and western Hawaii." Recently, material has been found from two more islands of the Hawaiian archipelago: *Rock & Hashimoto*, Honokohau, West Maui, August, 1918 (Arn.); *Harold St. John et alii* 12,719, Halawa, Molokai (Field).

Labordia hirtella var. **sororia** Sherff, Amer. Journ. Bot. 25: 582. 1938.

This variety was based upon J. F. Rock 8,152 as its type. A more fully labeled duplicate specimen at Arnold Arboretum has Rock & Hammond given as the collectors of this no. 8,152. Besides the originally published data we may note that the type material grew at the bottom of Honokawai Gulch, was a small shrub, and had its flowers pale lemon-colored.

Stenogyne macrantha amicarum Deg. & Sherff, var. nov.

Varietas varietati *Grayi* H. M. affinis sed foliis (rarius irregulariter inciso-dentatis vel -lobatis) infra glabratis vel primum sparsim

adpresso-hispidis, caulibus ramisve mox glabratis (ut videtur primum valde adpresso- non patenti-retrorsis) differt. Verticillastra (2 visa) 6-flora. Calyx glabratus, 6–8 mm. longus. Corolla flavus, 1.8–2.2 cm. longa.

A variety similar to var. *Grayi* H. M. but differs: Leaves (these rather seldom irregularly incised-dentate or -lobate) glabrate beneath or at first sparsely appressed-hispid; stems or branches presently glabrate (apparently at first strongly appressed- not spreading-retrorse). Floral whorls (2 observed) 6-flowered. Calyx glabrate, 6–8 mm. long. Corolla yellow, 1.8–2.2 cm. long.

Specimens examined: *Mrs. Helen Shiras Baldwin* (*Otto Degener distrib.* no. 12,903), Makahanaloa, Isl. Hawaii, October, 1940 (Berl.; Deg.; Field); *Miss Ethel Tomoguchi* 2, alt. 2,000 feet, same locality, February 22, 1940 (Field, a sterile branch, apparently of younger hence pubescent material); *eadem* 3 (*Otto Degener distrib.* no. 12,814), shrub or shrubby vine with yellow flowers, alt. 2,200 feet, same locality and date (type, Field).

Mrs. Helen Shiras Baldwin, of Hilo, Isl. Hawaii, under date of May 1, 1940, enclosed with a letter to Mr. Otto Degener several small specimens which had been collected by her "good friend Miss Ethel Tomoguchi." Two of these belong to *Stenogyne* Benth. and somewhat resemble in general habit specimens of *S. Calaminthoides* A. Gray. The smaller, yellow flowers of the one flowering specimen show, however, the affinity to be closer to *S. macrantha* Benth. In my monograph of *Stenogyne* (Bull. Bish. Mus. 136: 59. 1935), this material would run next to *S. macrantha* var. *Grayi* H. Mann under the second *i*, second *j* on page 61 and first *b*, first *c* on page 90. From that variety it differs in the characters noted.[1] The name *amicarum* is accorded this variety in allusion to the two ladies whose mutual friendship resulted in the sending of the type and associate material for our study and determination.

More recently Mrs. Baldwin has collected a large suite of additional specimens in the type locality. They lack flowers, but otherwise match the earlier specimens, except that three of them are anomalous in having all the leaf-blades a third or a half smaller in length and width and incisedly dentate or lobed even to the rachis. In *S. Scrophularioides* Benth. similarly dissected leaf-blades occur, in fact normally, but apparently as a rule toward the base of the stem.

[1] *S. macrantha* var. *Grayi* H. Mann was founded upon a single specimen, *Jules Remy* 381, Isl. Hawaii, 1851–55 (Herb. Gray). My photograph of that type shows the branches to be, even at the flowering and fruiting stage, densely and conspicuously spreading-hairy, the hairs but weakly retrorse.

It is interesting to note that in the closely related genus *Phyllostegia* Benth., the section *Genuinae* A. Gray is divided into the two subsections *Holophyllae* and *Lobatae* according as the principal leaves are simple or lobulate to pinnately divided.

Stenogyne kanehoana Degener & Sherff, sp. nov.

Caules tetragoni, ramis ultimis dense patenti-tomentosis. Folia opposita, petiolata petiolo tenui patenti-tomentoso 1–2 cm. longo; lamina nunc anguste ovata nunc oblongo-lanceolata, apice subobtusa vel acuta etiam subacuminata, basi nunc rotundata truncatave nunc vix subcordata, aegerrime crenulato-serrata, supra moderate subsparsimve infra densissime adpresso-hispida pilis gracilibus arcuatis acribus canescentibus, plerumque 7–12 cm. longa et 3–5 cm. lata. Verticillastra pauca (1 vel 2 pro ramulo quoque observata), 4- vel 6-flora. Pedicellus dense patenti-pilosus, circ. 8–12 mm. longus. Calyx late obconico-campanulatus, pubescens, manifeste vel demum aegre venosus, tubo 7–10 mm. longo; lobis triangulato-lanceolatis vel -oblongis, apice acutis, plerumque 4–8 mm. longis; sinibus inter lobos latis, basi rotundato-obtusis. Corolla (sicca) pallido-subpurpurea, supra ventricosa, extus moderate patenti-pilosa pilis apice saepe minutissime glandulo-capitatis, 2.5–3 cm. longa, arcuata, labro superiori quam inferiori paulo longiori, filamentis stamineis latere nunc convexo nunc concavo valde pilosis, stylorum ramis subaequalibus subulatis. Nuculae maturae non visae.

Stems tetragonal, ultimate branches densely spreading-tomentose. Leaves opposite, petiolate, the slender and spreading-tomentose petiole 1–2 cm. long; blade now narrowly ovate now oblong-lanceolate, at apex subobtuse or acute or even subacuminate, at base now rounded or truncate now barely subcordate, very weakly crenulate-serrate, on upper surface moderately or subsparsely on lower very densely appressed-hispid, commonly 7–12 cm. long and 3–5 cm. wide; hairs slender, curved, sharp, whitish. Floral whorls few (1 or 2 observed for each branch), 4- or 6-flowered. Pedicel densely spreading-pilose, about 8–12 mm. long. Calyx widely obconic-campanulate, pubescent, conspicuously or at least weakly veined, tube 7–10 mm. long; lobes triangulate-lanceolate or -oblong, at apex acute, commonly 4–8 mm. long; interlobar sinuses broad, at base rounded-obtuse. Corolla (in dry state) pale-purplish, supernally ventricose, on outer surface moderately spreading-pilose (the hairs often very minutely glandular-capitate at their apex), 2.5–3 cm. long, curved, upper lip a little longer than the lower, stamineal filaments strongly pilose now on the convex now on the

concave side, stylar branches subequal and subulate. Mature nucules not seen.

Specimens examined: *Otto Degener*, straggling over shrubs up to 15 feet high, on summit spur of Kanehoa, Isl. Oahu, April 14, 1940 (Berl.; Field); *Degener & Emilio Ordoñez* 12,374, same locality, May 28, 1939 (type, Field: cotypes, Berl.; Deg.; Field; etc.).

In my monograph on *Stenogyne* Benth. (Bishop Mus. Bull. 136: 59–101. 1935), this species would stand in that portion of the key under the last letter *e* on page 60. More precise location of its position is impossible as yet because of the uncertainty existing at least for the present regarding the color of its corollas in the living state. The leaves average larger than for the other species of *Stenogyne* and, in fact, are suggestive of the related genus *Phyllostegia* Benth. and certain varieties of such species as *P. parviflora* (Gaud.) Benth. The large calyces, exceptional for *Stenogyne*, call to mind *Phyllostegia vestita* Benth. The scandent habit, the axillary whorls of flowers, and the subulate style-branches are, however, typical of *Stenogyne*.

The type-collection lacked corollas and apparently mature fruits. Mr. Degener revisited the type plants on February 11, 1940, but succeeded in finding only "one single shriveled corolla . . . . too poor to really bother with." On April 14, 1940, he visited the type locality still a third time and obtained the two sheets of cited material, bearing, in all, five well developed corollas. From this last material the description of the corollas has been drawn.

Bidens pentamera (Sherff) Deg. & Sherff *ex* Sherff, Amer. Journ. Bot. 28: 31. 1941; *Bidens Campylotheca* var. *pentamera* f. *filicifolia* Sherff, Bot. Gaz. 85: 4. 1928.

The forma *filicifolia* was originally separated on the basis of its more numerous leaflets (7–9 instead of 5). Recently Mr. Otto Degener has revisited the type locality with his associate collectors and obtained additional material (Degener, Ordoñez, & Salucop 12,399, in jungle at 7,000 feet, within Koolau Gap on west side, Haleakala, East Maui, August 20, 1939 [Field]). He reports that the forma *filicifolia* must be reduced to synonymy with *B. pentamera*.

Bidens mauiensis var. **cuneatoides** Sherff (Bot. Gaz. 86: 440. 1928) ×**Bidens Menziesii** (Gray) Sherff, *op. cit.* 70: 98. 1920.

Bidens mauiensis var. *cuneatoides* has been known heretofore only from its type locality on the Isthmus of Maui, while *B. Menziesii*

was known from the islands of Molokai, Maui, and Hawaii. On August 25, 1939, Mr. Otto Degener discovered these two forms growing together on a small, arid, grassy ridge on the southeast side of Ukumehame Gulch, 1.75 miles from the southern coast of West Maui. Besides the typical form of *B. mauiensis* var. *cuneatoides* (Degener 12,405*a*) and of *B. Menziesii* (Degener 12,405*e*), there were collected perhaps two hundred additional specimens which were apparently hybrids (Degener 12,405*b*) or unmistakably such (Degener 12,405*c*, Degener 12,405*cc*, and Degener 12,405*d*) between the two. Recognizing the hybrids as new to science, Mr. Degener very kindly lent the entire suite of specimens for my study. Generally speaking, the hybrids display so many inconstancies in foliage and inflorescence that it would be difficult to draw a worth-while description of them. In a rough way, however, I have found it possible, by relying upon foliage characters and disregarding numerous intergradations of inflorescence, to divide them into groups or categories:[1] Degener 12,405*b*, leaves somewhat as in the tripartite-leaved form of *B. mauiensis* var. *cuneatoides*, but with divisions sometimes five, often narrower and more elongate, the terminal one commonly long-attenuate to acute or acuminate at apex (or again incisedly toothed); Degener 12,405*c*, leaves frequently bipinnatifid, segments usually narrowly linear; Degener 12,405*cc*, with somewhat similar leaves, but these a little more bipinnate and more delicately cut; Degener 12,405*d*, similar to no. 12,405*c*, but with leaves somewhat larger and divisions often broadly linear. A representative set of these variants has been deposited in the Herbarium of Field Museum and Mr. Degener plans to distribute the remaining duplicates in due time to numerous other institutions.

Bidens chiapensis Brandegee, Univ. Calif. Publ. Bot. 6: 76. 1914.

In my monograph of the genus *Bidens* (Field Mus. Bot. Ser. 16: 531. 1937), the geographic range for *B. chiapensis* was given as "State of Chiapas to State of Michoacán, southern Mexico." This range is now seen to be extended well into southwestern Guatemala by the following recently collected specimens: *Jorge Garcia Salas* 1,417, alt. 2,000 meters, Bosques de Cichavac, Dept. Chimaltenango (Field); *Paul C. Standley* 60,940, suberect herb, 1–2 feet tall, rays bright yellow, in brushy pine forest, alt. 2,400–2,700 meters, Cerro de Tecpám, region of Santa Elena, Dept. Chimaltenango, December

[1] The letters *a*, *b*, *c*, etc. suffixed to Mr. Degener's collection-number were placed on the labels by myself.

26, 1938 (Field); *Standley* 65,892, erect herb, 2–3 feet tall, rays yellow, in *Cupressus* forest, alt. 3,000–3,450 meters, near Cumbre del Aire, Dept. Totonicapán, on road between Huehuetenango and Sija, February 20, 1939 (Field); *Julian A. Steyermark* 35,663, herb, rays and disk yellow, on shaded slopes of steep ravine, alt. 2,700–3,800 meters, along road, 8–18 miles northwest of San Marcos, Dept. San Marcos, February 15, 1940 (Field); *Steyermark* 35,744, on shaded slopes at base of cliffs, alt. 2,700–3,800 meters, along road, 8–18 miles northwest of San Marcos, Dept. San Marcos, February 15, 1940 (Field); *Steyermark* 36,001, flowers dull golden-yellow, in shade of other plants in swampy meadow, alt. 2,200–2,500 meters, along Quebrada Canjulá, between Sibinal and Canjulá, Volcán Tacaná, Dept. San Marcos, February 18, 1940 (Field).

In some of this material, the achenes are longer than formerly known and the outer ones tend somewhat to reflex finally in their upper portion. In the Salas specimen the longest achenes have the body measuring 1.5 cm. long.

Bidens Chrysanthemifolia (H.B.K.) Sherff, Bot. Gaz. 61: 501. 1916.

In my monographic treatment of the genus *Bidens* (Field Mus. Bot. Ser. 16: 353. 1937), this species was said to be "known only from Department of Amatitlan, Guatemala." This range is now seen to be extended by the following specimens from Guatemala: *Julian A. Steyermark* 33,071, rays white, disc yellow with purple anthers, stems sprawling, on moist shaded north-facing pine slopes, alt. 1,800 meters, in hills between Güisiltepeque and Potrero Carrillo, Dept. Jalapa, December 11, 1939 (Field); *Steyermark* 36,081, rays white, disc yellow, leaves dull-green, in open field, alt. 2,500–4,400 meters, between Sibinal and summit of Volcán Tacaná, Dept. San Marcos, February 19, 1940 (Field).

Bidens Chrysanthemifolia var. **parvulifolia** (Sherff) comb. nov.; *Bidens parvulifolia* Sherff, Bot. Gaz. 56: 490. 1913.

In the above cited monograph of the genus *Bidens*, I interpreted (p. 356) my previously described *Bidens parvulifolia* "as merely a form of *Bidens Chrysanthemifolia* having minute, mainly undivided leaves." Very recently there has been assembled at Field Museum an exceptionally choice representation of material from Guatemala, and from this material it is evident that *B. parvulifolia* is constant enough in its foliar characters to merit treatment as a variety of *B. Chrysanthemifolia*. Both *B. Chrysanthemifolia* and its var.

parvulifolia, as we may now designate it, are seen from the recent collections to be at times much larger, more robust plants than formerly known. They may reach a height or (in procumbent plants) a length of 9 or 10 dm., with leaf-blades up to ±5 cm. long and ±2.5 cm. wide. The var. *parvulifolia* will include forms with simple or at times tripartite principal leaves, while the species proper will include forms with leaves considerably more dissected. For var. *parvulifolia* the following specimens, all from Guatemala, may be cited: *Heyde & Lux* 6,162, Guatemala, 1894 (Field; U.S.); *Heyde & Lux* 6,163, Guatemala, 1894 (Herb. Univ. Chicago in Field, type); *Jorge Garcia Salas* 1,397, alt. 2,300 meters, Chichavac Tecpan, Dept. Chimaltenango (Field); *Paul C. Standley* 59,390, erect or procumbent, abundant, rays white, alt. 1,800–2,100 meters, slopes of Volcán de Agua, north of Santa María de Jesus, Dept. Sacatepéquez, December 10, 1938 (Field; *nom. incolarum*, Mozote); *Standley* 65,242, erect or decumbent, rays white, in damp forest, alt. 2,250–3,000 meters, on slopes of Volcán de Agua, above Santa María de Jesus, February 11, 1939 (Field); *Standley* 67,322*a*, alt. about 2,500 meters, between Fuentes Georginas and Zunil, Dept. Quezaltenango, March 4, 1939 (Field); *Standley* 67,820, decumbent, rays white, in sandy *Alnus* forest, alt. about 2,400 meters, Cumbre de Tuilacán, southwest of San Martín Chile Verde, Dept. Quezaltenango, March 8, 1939 (Field); *Standley* 67,846, erect herb, 3 feet tall, rays white, in sandy *Alnus* forest, alt. about 2,400 meters, same place and date (Field); *Julian A. Steyermark* 32,751, rays cream-yellow, on open slopes in pine woods, below summit, alt. 2,000–2,500 meters, between Miramundo and summit of Montaña Miramundo, between Jalapa and Mataquescuintla, 6 miles south of Miramundo, Dept. Jalapa, December 5, 1939 (Field); *Steyermark* 32,752, rays white, disc yellow, leaves light-green, in open pine woods below summit, same place and date (Field); *Steyermark* 34,474, rays white, disc yellow, leaves soft and thickish, alt. 2,500 meters, ravine below Fuentes Georginas, just above Zunil, Dept. Quezaltenango, January 20, 1940 (Field; a small plant, closely similar to type specimen); *Steyermark* 34,945, leaves membranaceous, grass-green above, paler beneath, rays white, disc yellow, alt. 3,000–3,300 meters, Volcán Santo Tomas, Dept. Quezaltenango, January 24, 1940 (Field); *Steyermark* 35,644, rays white, disc yellow, alt. 2,700–3,800 meters, along road "between San Sebastián at km. 21 and km. 8, 8–18 miles northwest of San Marcos," Dept. San Marcos, February 15, 1940 (Field).

Cosmos Steyermarkii sp. nov.

Herba annua, erecta, gracilis, 3–5 dm. alta, supra suberecte pauciterque ramosa; caule ±12-sulculato, irregulariter sparsimque patenti-setuloso vel raro -spinuloso, internodiis medianis 2–9 cm. longis; ramis in pedunculos elongatos (etiam usque ad ±18 cm. longos) inferne lineari-bracteatos gracillimos glabros monocephalicos desinentibus. Folia opposita, suberecta, graciliter petiolata petiolo submarginato plerumque glabro usque ad circ. 2 cm. longo; lamina pinnata vel bipinnatifida, 3–5 cm. longa, foliolis lateralibus 1 vel 2 jugis, segmentis lineari-filiformibus plerumque sub 1 cm. raro usque ad 2 cm. latis glabratis ultimis acriter apiculatis. Capitula radiata pansa ad anthesin 2–3.5 cm. lata et 8–11 mm. alta. Involucri bracteae exteriores circ. 7 vel 8, lineari-spathulatae vel prope apicem latius dilatatae, extus glabratae vel secundum nervum medianum atrum hispidulae, marginibus ciliatae, apice acri induratae, 3–4 vel demum etiam 5 mm. longae; interiores oblongae vel oblanceolato-oblongae, glabrae vel apice pubescentes, marginibus hyalinae alibi badiae, 4–8 (demum usque ad 10) mm. longae. Flores ligulati 5 vel 6, aurei, 1–1.8 cm. longi, ligula lineari-oblongi, apice 2- vel 3-denticulati vel aegre incisi. Flores tubulosi gracillimi, supra flavi, sub 5 mm. longi, non nisi dentibus anguste lanceolatis pubescentes. Achaenia paleas multo superantia, aristis inclusis usque ad 2.8 cm. longa; corpore subplano, atro, glabro vel ventraliter secundum nervum medianum plus minusve tuberculato-setuloso, marginibus basaliter stramineo-tuberculato (tuberculis antrorsum spinulosis) aliter anguste stramineo-alato (alis crassis induratis cartilagineis ut videtur e tuberculis coalitis ortis ergo ciliatim et similiter antrorsum spinulosis), usque ad circ. 1.6 cm. longo et alis inclusis ad 3 mm. lato; cervice plana, angusta, straminea vel purpurascenti, ciliatim antrorsumque tuberculato-setulosa, usque ad 1 cm. longa, apice biaristata; aristis gracilibus, rectis vel subarcuatis, moderate divergentibus, antrorsum hispidulis, 1.5–2.5 mm. longis.

Annual herb, erect, slender, 3–5 dm. tall, suberectly and sparingly branched above; stem ±12-sulculate, irregularly and sparsely spreading-setulose or rarely -spinulose, median internodes 2–9 cm. long; branches running into elongate peduncles, these linear-bracteate below, very delicate, glabrous, monocephalous, up to even ±18 cm. long. Leaves opposite, suberect, slenderly petiolate, the submarginate petiole commonly glabrous and up to about 2 cm. long; blade pinnate or bipinnatifid, 3–5 cm. long, lateral leaflets 1 or 2 pairs; their segments linear-filiform, commonly under 1 cm. rarely

up to 2 cm. wide, glabrate, the ultimate ones sharply apiculate. Capitula radiate, expanded at anthesis 2–3.5 cm. wide and 8–11 mm. tall. Exterior involucral bracts about 7 or 8, linear-spatulate or near apex more widely dilated, outwardly glabrate or along the dull-black median nerve hispidulous, marginally ciliate, apically sharp and indurated, 3–4 or finally even 5 mm. long; interior bracts oblong or oblanceolate-oblong, glabrous or apically pubescent, hyaline at edges but elsewhere chestnut-brown, 4–8 (finally up to 10) mm. long. Ligulate florets 5 or 6, golden-yellow, 1–1.8 cm. long, the ligule linear-oblong, at apex 2- or 3-denticulate or weakly incised. Tubular florets very slender, yellow above, under 5 mm. in length, not pubescent unless on the narrowly lanceolate teeth. Achenes much surpassing the pales, up to 2.8 cm. long including the aristae; body flattish, dull-black, glabrous or ventrally more or less tuberculate-setulose along the median nerve, at margins stramineous-tuberculate below (tubercles antrorsely spinulose) elsewhere narrowly stramineous-alate (wings thick, indurated, cartilaginous, seemingly formed from coalesced tubercles therefore ciliately and in a similar way antrorsely spinulose), up to about 1.6 cm. long and with wings included up to 3 mm. wide; neck flat, narrow, stramineous or becoming purple, ciliately and antrorsely tuberculate-setulose, up to 1 cm. long, at apex biaristate; aristae slender, straight or somewhat curved, moderately divergent, antrorsely hispidulous, 1.5–2.5 mm. long.

Specimens examined: *Julian A. Steyermark* 31,341, on dry, rocky slope of glade, alt. 1,200–1,500 meters, Montaña Castilla, vicinity of Montaña Cebollas, along Rio Lucía Saso, 3 miles southeast of Quezaltepeque, Dept. Chiquimula, Guatemala, November 6, 1939 (type, Field: cotype, Gray).

In the key published in my monographic revision of the genus *Cosmos* (Field Mus. Bot. Ser. 8: 402. 1932), this species would stand next to *C. Blakei*, from which it differs, among other respects, in having a much more delicate habit, leaves under 7 cm. not ±1 dm. long, segments linear-filiform rather than linear; heads 5- or 6- not about 10–12-rayed, their involucres externally glabrous or glabrate not definitely pubescent, the outer bracts shorter, narrower, and apically less dilated; peduncles very slender, elongate (up to ±1.8 dm. long) and glabrous, not robust, of comparatively moderate length (under 1.2 cm. long), and densely pubescent. With *C. exiguus* and *C. Blakei*, *C. Steyermarkii* belongs to the section *Klibea* (*op. cit.* 423).

Cosmos Crithmifolius H.B.K. Nov. Gen. et Sp. 4: 190 (242). 1820.

In my monographic revision of *Cosmos* above cited, the southern limits of distribution for *C. Crithmifolius* were given (p. 426) as Guatemala and Honduras. Only a single specimen (W. C. Shannon 608) was known to me at that time from Guatemala, and this was from Amatenango, in the extreme western part of the country, virtually at the Chiapas border. Similarly, only a single specimen (P. C. Standley 56,245) was known from Honduras, and this had come from the Department of Comayagua, some 300 miles to the east of Amatenango. Recently, additional specimens have come in from various localities reaching across almost the entire southern half of Guatemala. These are: *Paul C. Standley* 58,001, erect herb, 3–4 feet tall, rays deep rose, in pine forest, alt. 1,500–1,900 meters, along road from Chimaltenango to San Martín Jilotepeque, Dept. Chimaltenango, November 25, 1938 (Field); *Julian A. Steyermark* 30,655, rays pink-brick color, on oak-pine slopes, alt. 500–1,200 meters, along Río Taco, between Chiquimula and Montaña Barriol, 3–15 miles northwest of Chiquimula, Dept. Chiquimula, October 26, 1939 (Field); *Steyermark* 32,590, in dry oak woods two-thirds way up, alt. 1,300–1,700 meters, Cerro Alcoba, just east of Jalapa, Dept. Jalapa, December 2, 1939 (Field); *Steyermark* 32,741, rays rose-lilac, on open slopes in open pine woods below summit, alt. 2,000–2,500 meters, between Miramundo and summit of Montaña Miramundo, between Jalapa and Mataquescuintla, 6 miles south of Miramundo, Dept. Jalapa, December 5, 1939 (Field); *Steyermark* 32,999, rays rose-purple, in dry, rocky oak woods, three-fourths way up, alt. 1,400–1,900 meters, Montaña Durazno, 2 miles east of San Pedro Pinula, Dept. Jalapa, December 10, 1939 (Field; *nom. vernac.*, escobillo); *Steyermark* 33,081, rays rose-colored, on moist, shaded, pine-covered slopes in hills between Güisiltepeque and Potrero Carrillo, alt. 1,800 meters, Dept. Jalapa, December 11, 1939 (Field).

Cosmos exiguus A. Gray, Proc. Amer. Acad. 22: 429. 1887.

In the same above cited monographic revision of *Cosmos*, the geographic distribution of *Cosmos exiguus* A. Gray was given as "western Mexico from the State of Sinaloa southeastward to the State of Michoacan." From the following recently examined additional specimens, the range is seen to be extended northward into the State of Chihuahua in northern Mexico, eastward into the

State of Mexico and southeastward into southwest Guatemala: *Howard Scott Gentry* 2,017, flower lavender, rays with a purple stripe, in thin gravel soil on rocks on sun slope, pine ridge, Sierra Canelas, Río Mayo, Chihuahua, October 8, 1935 (Field); *Gentry* 2,825, flower purple, on oak sun slope, Upper Sonoran, La Cienegita, Río Mayo, Chihuahua, September 20, 1936 (Field); *George B. Hinton* 2,126, on grassy hill, alt. 2,030 meters, Carboneras, District of Temascaltepec, (State of) Mexico, October 24, 1933 (Field); *Hinton* 5,081, flower pink, alt. 1,960 meters, in pine woods on hill, Rincón, District of Temascaltepec, November 8, 1933 (Field); *Paul C. Standley* 82,338, scarce, heads purplish-pink, alt. about 1,780 meters, in pine-oak forest, Río Pucal, about 14 km. south of Huehuetenango, Dept. Huehuetenango, southwestern Guatemala, January 4, 1941 (Field).

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